



## DEPARTMENT OF THE ARMY

HEADQUARTERS UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND  
FORT MONROE, VIRGINIA 23651-5000

REPLY TO  
ATTENTION OF

*8 Feb 99*

ATCD-RP

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Operational and Organizational (O&O) Planning for  
Materiel Systems

1. References:

- a. TRADOC Pam 71-9, 1 Aug 98, Requirements Determination.
- b. Memorandum, HQ TRADOC, ATCD-RP, 15 May 98, subject:  
TRADOC System Program Review (SPR).
- c. Memorandum, HQ TRADOC, ATCD-ZA, 11 Jan 99, subject:  
Development of Warfighting Concepts of Operation.

2. This memorandum provides system level O&O concept-planning guidance for immediate implementation. It amplifies current guidance and will be included in this year's update to TRADOC Pam 71-9.

3. The Force XXI requirements generation process places an increased emphasis on the O&O concepts for systems being developed and the requirements documents that support them. The O&O concept must clearly show how the system supports Army XXI. The O&O concept is summarized in the Mission Need Statements (MNSs), Capstone Requirement Documents (CRDs), Operational Requirements Documents (ORDs), and System Program Reviews (SPRs). These summaries document the system's Army XXI connection to an approved TRADOC concept and establish its contribution, employment, and impact. Requirements documents that do not clearly show the link to Army XXI are being challenged with regard to need and are finding it difficult to gain approval or support.

4. A sound, well thought out O&O concept will aid in the development of rationale for KPPs and their associated threshold values.

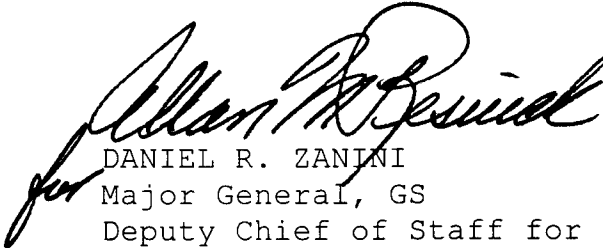
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5. The O&O concept summary in Paragraph 1 of the Close Range-Tactical Unmanned Aerial Vehicle (CR-TUAV) ORD is enclosed as an example. Of those reviewed to date, it best depicts expectations for O&O concept content of CRDs and ORDs. Paragraph 1 will also include reference to appropriate TRADOC Pam 525 series concept, a list of associated future operational capabilities, and other information described in TRADOC Pam 71-9 CRD and ORD formats.

FOR THE COMMANDER:

Encl

  
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System Operational and Organizational (O&O) Planning Excerpt  
from Paragraph 1 of  
U.S. Army operational Requirement Document for  
Close Range - Tactical Unmanned Aerial Vehicle (CR-TUAV)  
"Brigade Commander's UAV"  
Dated 11 Dec 1998

"d. Operational Concept. The CR-TUAV is a ground maneuver brigade commander's UAV. It allows him to "see and understand" his battlespace and gain dominant situational awareness on the Army XXI battlefield. The CR-TUAV is the critical component of the Army XXI Brigade's collection package. It gives maneuver commanders the ability to look into the battlespace where ground recon assets can not penetrate or cover in a timely manner. It can also observe heavily protected areas where commanders are hesitant to commit manned aerial platforms. Lastly, it gives commanders a dedicated, rapidly-taskable asset with the capability to look wide as well as deep into their battlespace. It allows them to "see critical elements of the battlespace" and support the increased demand for immediate situational awareness on the Army XXI battlefield. The CR-TUAV is a critical tool to obtain the hard to get information needed to satisfy the commander's Priority Intelligence Requirements (PIR) and Commanders Critical Information Requirements (CCIR). It's a command and control enabler for tactical decision making.

(1) The CR-TUAV system will provide flexible, responsive RSTA, Battle Damage Assessment (BDA), and battle management support to ground maneuver commanders at brigades, armored cavalry regiments (ACR) and light divisions. The CR-TUAV is dynamically retaskable in flight to ensure it is responsive to the commander's immediate needs/changing CCIR. To optimize its capabilities, CR-TUAV is fully integrated with and cued by sound IPB and other collection systems such as JSTARS, Guardrail Common Sensor (GRCS), Artillery Counter Mortar/Battery Radars and FAADC2, in a synchronized effort to support the Warfighter. As demonstrated during the Force XXI AWEs, the information is fed directly to the brigade commander (as well as the S3 and FSCoord); but in the meantime, the information is fused to answer CCIRs. Regardless of the UAV's role, the operations officer must ensure the UAV is synchronized with all of the other assets within the battlespace.

(2) The maneuver brigade is the premier combined arms formation for dominant maneuver on the Army XXI battlefield. The Army XXI brigade will operate on a non-linear battlefield

moving at high speeds and controlling a greatly enlarged battlespace. Armed with superior situational awareness and continuous real-time Intelligence Preparation of the Battlefield (IPB), the brigade maneuvers with speed and precision to gain positional advantage on the enemy. When in position, the brigade executes decisive operations by massing the effects of direct and indirect fires at a tempo the enemy cannot match to seize and retain terrain and defeat or destroy enemy forces.

(3) This is a ground maneuver brigade commander's tactical UAV. The UAV priority is to support the maneuvering of the brigade and battalions, including fire support of maneuver. The brigade commander's UAV must be simple (threshold capability--no bells and whistles), inexpensive, easy to maintain; profiled to meet the brigade commander's needs. It needs to keep pace on the Army XXI battlefield. Launch and recovery must be from an area easily accessible to a brigade commander. Rapid set up and tear down times will ensure it keeps pace with the brigade's movement. To facilitate rapid movement, the control of the UAV may be passed to other control stations or launch/recovery stations to allow continuous flight operations to meet the commander's requirements. Due to the signature associated with the launch and recovery (L/R) of the UAV, the L/R area will normally not be collocated with the brigade TOC. However, the mission planning, tasking, and dissemination will occur through the TOC via a collocated ground control station (GCS) or, at a minimum a remote video terminal (RVT) with compatible communications for tasking and dissemination. Additionally, the brigade commander can locate up to four remote video terminals (RVT) throughout the brigade. As an example, he may choose to keep one with him, locate one each with a forward battalion, scouts, and the direct support artillery battalion. Additionally, future operations demand "information on the move". As such, the UAV is a key brigade collection asset that supports the near real time visualization of the battlespace and is focused on the brigade's decisive operations.

(4) The brigade commander requires sufficient coverage to fight on his and the battalion commanders' piece of ground. Specifically, the UAV is used to cover the dead space in front of the ground reconnaissance -- it extends the ground reconnaissance capability. It complements the Brigade Recon Troop's (BRT) ability to collect ground-level recon targets with a wider-area overhead look. As such, it helps eliminate the unknown and allows the commander to anticipate and respond - to pre-empt. In terms of IPB, the UAV helps the commander during the planning, preparation, and execution phases.

(a) During the planning phase the commander needs to understand the ground, and answer the following questions: Where can I move? What are the avenues? Where are the obstacles? The UAV allows the commander to see and assess environmental benefits and limitations and answer those questions. In turn, those factors will support the development of friendly considerations, and formulation of enemy COAs for the planning staff. The UAV allows the commander to quickly assess critical components of his battlespace, such as trafficability, suitability for logistical and fire support assets, and activities of civilians on the battlefield during the planning process. Without this asset, the Commander will have to commit slower moving, precious ground maneuver assets to answer these planning questions.

(b) During preparation, the commander validates his templates by BOS - he recons, in accordance with the plan, verifies the templates, and determines where the enemy is and is not. Additionally, the commander can redirect/frag his air recon (UAV) to a different mission and area. He cannot always do this with ground recon - once in, if they are fixed and attempt to move, they may die. Additionally, the commander needs to determine where he can take risk; where he can economize on forces. Instead of using troops on the flanks, the UAV can assist by providing surveillance in those areas. The UAV greatly enhances the effectiveness of the commander's counter-recon effort during the preparation phase. The UAV's mobility and range allow him to economize limited ground recon assets for the execution phase, without sacrificing his ability to detect indications of unexpected enemy spoiling actions such as Raids, Reconnaissance in Force, Fire Support Raids, etc.

(c) During execution, the UAV helps determine maneuver options/friendly courses of action. As an example, it helps answer the question, "Is that truly an assailable (or unassailable) flank?" Another example: As the brigade penetrates the enemy defense, the commander may want the UAV over the enemy reserves, to determine when and where they are moving. The brigade commander may use a UAV capability to simultaneously look deep into his battlespace while his ground recon assets and maneuver units observe closer NAIs. With this confidence that he can receive critical information during the fight-"just-in-time intelligence"-the commander can take prudent risk without fear that he will outrun his collection assets.

(d) The brigade commander's UAV needs to be dedicated for the close battle. It needs to be responsive to the current

situation. The commander needs the information when it happens - not maybe; not later; not reprioritized by a higher command. The brigade commander's UAV needs to be focused for decisive operations in the brigade battlespace.

(e) In summary, the CR-TUAV is the brigade commander's most versatile confirming sensor -- his "dominant eye" -- and responds directly to his requirements. To optimize its capabilities and responsiveness to the commander, it is linked to/cued by sound IPB and wide area sensors, such as the direct feed to the JSTARS CGS when collocated with the GCS, and as an objective, direct live feed from the UAV to the CGS. Additionally, it must be interoperable with C4ISR systems and linked into the Army's Battle Command System, in particular ASAS, AFATDS, and FAADS for distribution via intelligence channels, targeting, and to meet air defense identification requirements. Due to the complexities of airspace management (ASM), even at the brigade, it needs to feed into the A2C2 system. Some of those areas are defined more precisely below.

e. System Description.

(1) A CR-TUAV system consists of four basic components: the Ground Control Stations (GCS) and related equipment; Air Vehicles (AV); Modular Mission Payloads (MMP); and communications.

(a) The system will have a minimum of two GCSs, two Ground Data Terminals (GDTs), one Portable Ground Control Station (PGCS) and one Portable Ground Data Terminal (PGDT) with line of sight (LOS) command and control links to, and receipt for telemetry and imagery from, the Air Vehicle (AV). Additionally, it will have four Remote Video Terminals (RVT) to provide payload information in the area of operations. The system's four RVTs that receive NRT video/telemetry from the AV can be used by: the brigade in the Tactical Operations Center (TOC) (if a GCS is not collocated), the brigade's subordinate maneuver battalions, or by direct support artillery or supporting aviation assets. RVT's will be allocated by the commander, based on METT-T, to support his scheme of maneuver.

(b) The system will have sufficient AVs to support a wartime surge OPTEMPO described below, as well as a means of launch and recovery, and the necessary transportation and ground support equipment for the operations and maintenance of the system. The system is designed to be easy to launch, operate, recover, and maintain with a minimum of training, logistics, and personnel. It must present a small profile in order to reduce its signature; rapidly tear down, deploy and set up; and minimize any impact on



brigade CSS resources. A crew of approximately 14 will operate and maintain a full baseline (AVs and two GCSs) at the OPTEMPO indicated below augmented with the divisional Mobile Maintenance Facility (MMF) for sustainment beyond the initial 72 hours of operations.

(c) The system will be capable of near real time (NRT) transmission of Electro Optic/Infrared (EO/IR) imagery. Initially, the system will have a basic EO/IR mission payload, but will have a capability for growth to accommodate additional MMPs.

(d) The CR-TUAV provides unclassified products via an unsecured datalink. The GCS gives ready interface to the existing Command, Control, Communications, Computers, and Intelligence (C4I) architecture, to include CGS, AFATDS, ASAS, FAADS, and A2C2. Intelligence reports from the GCSs include voice, electronic dissemination and/or video via the various communication systems in the GCS. Communications for the system are integrated into the air vehicles and ground control components and allow for transmission and receipt of command and control data, telemetry and imagery. Additional communications and intelligence dissemination are provided via the standard DoD tactical (VHF and UHF) radios, Mobile Subscriber Equipment (MSE), and the Tactical Local Area Network (TACLAN).

(2) The CR-TUAV baseline is capable of 12 hours of continuous operations within a 24-hour period. The system has the capability of surge operations for 18 hours within a 24-hour period for no more than three consecutive days, with the following day being limited to eight hours of operations. Although the system has the capability to surge for 18 hours of 24 hours for 72 hours, the CR-TUAV baseline and its' parent brigade may be reconstituted after 36 hours. The objective system will be capable of 18 hours of continuous operations within a 24-hour period with a surge capability of 24 hours of 24 hours for a period of 3 days.

(3) It can operate during less than ideal weather conditions (operates in environments similar to a small light aircraft) with a range of 50 kms from the launch and recovery site, flying at altitudes of 14,000 feet Mean Sea Level (MSL) or greater. Nominal operating altitudes/survivable altitudes are from 8,000 to 10,000 feet Above Ground Level (AGL) for day operations and between 6,000 to 8,000 feet AGL for night operations.

(4) The CR-TUAV system will have an endurance of four hours on station at 50 kms (3-4 hrs at 200km objective).

(5) The threshold system will carry enough supplies and spares for initial operations.

(6) The complete CR-TUAV system will fit in no more than two High Mobility Multipurpose Wheeled Vehicles (HMMWVs) with shelters, two Cargo/Troop carrying HMMWVs, and two trailers with enough room for all personnel, crew members' combat equipment (rifles, helmets, camouflage netting, individual protective equipment, etc.) and enough Class I (subsistence) and Class III (Petroleum, Oils, and Lubricants) and Class IX (repair parts) supplies for initial operations (threshold)/seven-day period (objective). A threshold requirement is for a system configurable to deliver 72 hours of operational capability at a minimum of 12 flight hours on station in a 24 hour period deployable in a single C-130 sortie (using the HMMWV as the prime mover and including transportation for the entire "reduced" crew). Sustainment beyond the initial 72 hours is supported with a divisional mobile maintenance facility (MMF) consisting of a HMMWV and trailer.

(7) The complete baseline CR-TUAV system with personnel and equipment, must be transportable in no more than two C-130 sorties. The addition of a mobile maintenance facility (HMMWV with shelter and trailer) will require an additional C-130.

f. Support Concept.

(1) Hardware. The CR-TUAV equipment will be supported in accordance with the IEW Sustainment Streamlining (IEWSS) System, to include Contractor Logistics Support (CLS). The CR-TUAV maintenance concept may be Life Cycle Contractor Logistics Support. The system will be maintained IAW Aviation Unit Maintenance (AVUM) "on system repair" and Aviation Intermediate Maintenance (AVIM) "off system repair" Concept. Routine maintenance will be provided by system operators and the assigned maintenance personnel augmented (as required) by the divisional MMF. Higher level maintenance will be accomplished at the Forward Repair Activity (FRA) and/or the Electronic Service Support Center (ESSC) within theater to allow for quick turn around of critical system components.

(2) Software. The CR-TUAV system software will be maintained through standard Army life cycle software support concepts, to include CLS. The CR-TUAV system software will be updated, as required, to ensure compatibility with Military Intelligence, Aviation, and targeting systems. CR-TUAV system software will retain compatibility with older fielded systems and provide improved performance through Pre-planned Product Improvements (P3I)."